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Intel® PRO/100+

Client Adapter

Installation Guide

September 1998

Put the Adapter in the Computer

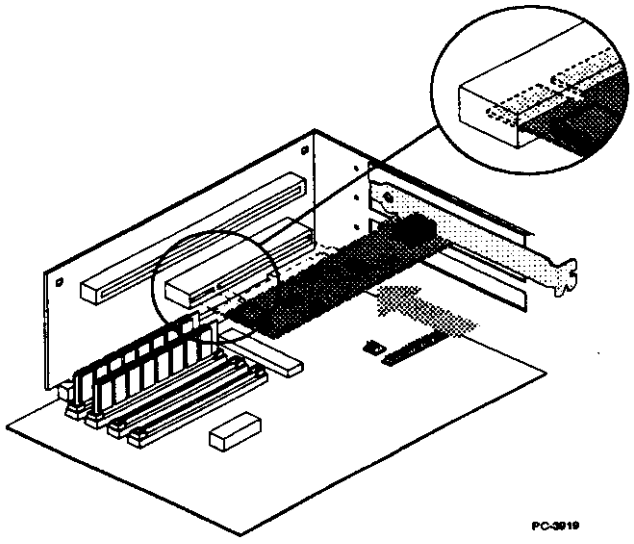
NOTE: If you are replacing an existing adapter with the PRO/100+ adapter in Windows* 95, see the section *Removing an Existing Adapter in Windows 95* later in this guide.

1. Shut down Windows (if it's running) by clicking the Start button, and then clicking Shut Down.
2. Turn off the computer and unplug the power cord. Then remove its cover.



WARNING: Turn off and unplug power to the computer before removing its cover. Failure to do so could shock you and may damage the adapter or computer.

3. Remove the cover bracket from a PCI busmaster adapter slot. Most computers have busmaster-enabled slots. If you have configuration problems, see your computer's documentation to determine if the PCI slots are busmaster-enabled.
4. If you have a PRO/100+ Management Adapter, and want to enable the Wake On LAN* feature, see the section *Connect the Wake On LAN Power Cable* later in this guide before completing the rest of these steps.
5. Choose an empty bus mastering PCI slot and remove its backplate by unscrewing the screw which secures it.
6. Insert the PRO/100+ adapter into a PCI slot and push it into the slot until it's firmly seated. Then secure the adapter bracket with the screw you removed in step 5.



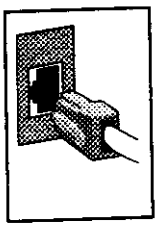
7. Replace the computer cover and plug in the power cord.

Connect the Network Cable

1 Connect a Twisted Pair Ethernet (TPE) network cable to the adapter as shown below.

- For 100BASE-TX, your network cable must be Category 5, twisted-pair wiring. If you plan to run the adapter at 100 Mbps, it must be connected to a 100BASE-TX hub or switch (not a 100BASE-T4 hub).
- For 10BASE-T, use Category 3, 4, or 5 twisted-pair wiring. If you want to use this adapter in a residential environment, you must use a Category 5 cable.

NOTE: Use a Category 5 TPE cable and an RJ-45 connector for this adapter. Do not use Category 3 wiring at 100 Mbps. At 100 Mbps, connect to a TX hub, not a T4 hub. For full duplex, see the section *Duplex Mode* later in this guide. For more information on 100BASE-TX wiring requirements and limitations, see *Fast Ethernet Wiring* in the *PCI Installation Tips* section later in this guide.



2 To configure the adapter, continue with the procedures specific to your operating system outlined later in this guide.

Connect the Wake on LAN Power Cable

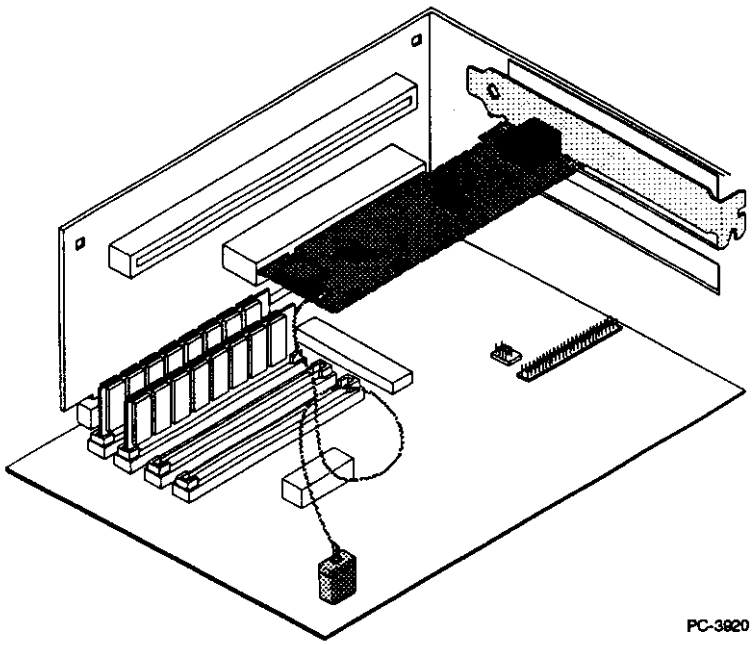
(Included with Management Adapters Only)

For the Wake on LAN (WOL) feature to work correctly, the adapter must be connected to a continuous power source. This allows the PRO/100+ adapter to "listen to" the network even when the computer is turned off. To install the WOL power cable, carefully follow the procedure below.



WARNING: Turn off and unplug power to the computer before installing the WOL cable. The WOL connector on your motherboard is live when the computer is plugged in to a power outlet. Failure to do so could damage the adapter or computer. Likewise, always unplug the computer prior to removing an adapter from the computer.

1 Make sure your computer is unplugged from the power outlet.
2 Locate the WOL connector on the PRO/100+ adapter. Attach one end of the WOL cable to the adapter as shown in the diagram that follows. Note that the connector is notched so as to prevent incorrect attachment.



3 Locate the WOL connector on your motherboard. The location varies, depending on the vendor and model of motherboard. The WOL connector is usually located near other power connectors, such as the LED connectors.

4 Connect the other end of the WOL cable to the connector on the motherboard as shown in the diagram.

5 Some computers may require you to change a setting in your computer's BIOS or Setup program to enable the WOL feature. Check your computer owner's manual or contact your dealer for more information.

6 Replace the computer cover and plug in the power cord.

Using Wake on LAN

The Wake on LAN feature operates according to a published specification. In simple terms, the specification allows designers to build network adapters that are capable of "listening to" network activity even when the computer is turned off.

WOL adapters have a special low-power standby mode that is active when the rest of the computer is without power. The adapter will respond to a special "wake-up" packet sent by another computer or network device. Typically this wake-up packet causes the adapter to signal the computer to power up and run a pre-defined program.

The wake-up packet structure and behavior is defined in a WOL information brief, available on the Web at:

`http://www.us.pc.ibm.com/infobrf/iblan.html`

See the section *Troubleshooting and FAQs* later in this guide for general troubleshooting and a listing of common problems and solutions for Wake on LAN operability.

Configure the Adapter and Install the Drivers

Novell NetWare 5.0 Only

Use the NetWare* Install program to install the PRO/100+ adapter driver in Novell NetWare 5.0. For Novell NetWare 4.1x, see the section *Novell NetWare 4.x Only*. For 3.11 and 3.12, see the readme files. For DOS ODI, see the section *DOS and Windows 3.1 Setup for Novell NetWare DOS ODI Clients*. The following procedure is a condensed description of the installation process.

1. From the NetWare console, type `LOAD INSTALL` and press Enter.
2. From the Configuration Options screen, choose "Driver options" and press Enter.
3. Choose "Configure network drivers" and press Enter. If any drivers are already loaded, a list of them appears.
4. Choose "Select an additional driver" and press Enter. A list of drivers appears.
5. Insert the Intel floppy disk or CD and press the Insert key to install an unlisted driver.
6. Specify the correct path to your media if necessary by pressing F3. Press Enter to search the floppy or CD-ROM drive.
7. Highlight the Intel(R) PRO PCI Adapter and press Enter to select it.
8. The next screens ask for frame and protocol types. Use the arrow keys to select specific items or choose the defaults. Select "Save parameters and load driver" to continue.
9. To install an additional adapter, press the Esc key to go back to the Step 7 prompt "Select an adapter to install." Then, repeat steps 7-9 for each additional adapter you want to install.
10. To complete the driver installation process, go back to the Installation Options screen by pressing the Esc key until you see it.
11. Choose Exit to return to the console prompt.

NOTE: If the adapter cannot transmit or receive following the installation, you may need to modify the frame type in the AUTOEXEC.NCF file.

Novell NetWare 4.1x Only

Use the NetWare install program to install the PRO/100+ adapter driver in Novell NetWare 4.1x. For Novell NetWare 3.11 and 3.12, see the readme files. For DOS ODI, see the section *DOS and Windows 3.1 Setup for Novell NetWare DOS ODI Clients*. The following procedure is a condensed description of the installation process.

NOTE: Prior to installing, either load DOS or NetWare drivers for your computer's CD-ROM drive or create a floppy disk from the CD on a different computer.

1. From the NetWare console, type `LOAD INSTALL` and press Enter.
2. From the Installation Options screen, choose "Driver options" and press Enter.
3. Choose "Configure network drivers" and press Enter. If any drivers are already loaded, a list of them appears.
4. Choose "Select an additional driver" and press Enter. A list of drivers appears.
5. Insert the Intel floppy disk or CD and choose "Install an unlisted driver" by clicking Insert.
6. Specify the correct path to your media if necessary by pressing F3. Press Enter to search the floppy or CD-ROM drive.
7. The driver name is displayed: Intel(R) PRO/100+ Adapter. Press Enter to select it.
8. The next screens ask for frame and protocol types. Use the arrow keys to select specific items or choose the defaults. Select "Save parameters and load driver" to continue.
9. To install an additional adapter, press the Esc key to go back to the Step 7 prompt "Select an adapter to install." Then, repeat steps 7-9 for each additional adapter you want to install.
10. To complete the driver installation process, go back to the Installation Options screen by pressing the Esc key until you see it.
11. Choose Exit to return to the console prompt.

NOTE: If the adapter cannot transmit or receive following the installation, you may need to modify the frame type in the AUTOEXEC.NCF file.

Windows 95

Windows 95 Automatic Configuration

PCI computers automatically detect and configure PCI-compliant adapters while booting. The BIOS automatically sets the adapter IRQ level and I/O address each time you start your computer.

Start your computer to automatically configure the adapter. Resource configuration is complete when Windows 95 starts.

If your computer displays an error while booting, it may require additional steps to configure. See the section *PCI Installation Tips* later in this guide for more information.

Install Network Drivers from Disk

Have your Windows 95 installation CD or diskettes available, since you'll be prompted for them when you install the new adapter.

1 After you put the adapter in the computer and connect the cable, start Windows 95.
You'll see the New Hardware Found dialog box.

NOTE: If this box does not appear and Windows 95 starts normally, you may need to manually add the adapter. See the MS.TXT readme file in the \MS directory for more information.

2 Click "Driver from disk provided by hardware manufacturer," then click OK. You'll see the Install From Disk dialog box.
3 Insert the PRO/100+ adapter disk.
4 Specify `D:\` (for a CD-ROM drive) or `A:\` (for floppy) as the path, then click OK.
5 Follow prompts for any Windows 95 installation disks and restart when prompted.

NOTE: If you installed from the CD, the installation files are typically located at D:\Win95, where D is your CD-ROM drive.

After restarting Windows 95, connect to your network by double-clicking the Network Neighborhood icon on the desktop.

Windows Troubleshooting

If you can't connect to a server or if Windows 95/98 reports an error after you double-click Network Neighborhood, try the suggestions here first, then turn to the section *Troubleshooting and FAQs* if necessary.

- Make sure you're using the drivers that are on the drivers disk that ships with this adapter.
- Make sure the driver is loaded and the protocols are bound. Check the Device Properties list for trouble indicators (an X or ! symbol).
- Test the adapter with the PROSet advanced configuration utility that was installed on your system when you installed the PRO/100+ adapter. To start PROSet, double-click on the PROSet icon in the Windows control panel. To run diagnostics, select the adapter and click the Diagnostics tab, then click Run Tests. For additional information, click Help in the PROSet window.
- Check with your LAN administrator — you may need to install additional networking software.

Windows 98

Windows 98 Automatic Configuration

PCI computers automatically detect and configure PCI-compliant adapters while booting. The BIOS automatically sets the adapter IRQ level and I/O address each time you start your computer.

Start your computer to automatically configure the adapter. Resource configuration is complete when Windows 98 starts.

If your computer displays an error while booting, it may require additional steps to configure. See the section *PCI Installation Tips* later in this guide for more information.

Install Network Drivers from Disk

1 After you put the adapter in the computer and connect the cable, start Windows 98. You'll see the New Hardware Found dialog box.

NOTE: If this box does not appear and Windows 98 starts normally, you may need to manually add the adapter. See *Manually Installing the Network Drivers* later in this section.

2 When prompted, insert the PRO/100+ adapter disk.
3 Specify `D:\` (for a CD-ROM drive) or `A:\` (for floppy) as the path, then click OK.
4 Restart the system when prompted.

Manually Installing the Network Drivers

1 After you put the adapter in the computer and connect the cable, start Windows 98.
2 Double-click the System icon in the Control Panel.
3 Click the Device Manager tab.
4 Double-click Network Adapters in the list area.
5 Double-click the Intel PRO/100+ adapter. The Update Device Driver Wizard appears.
6 Select "Search for a better driver than the one your device is using now." Make sure the PRO/100+ adapter disk is in the drive, and click Next.
7 Select the drive that contains the PRO/100+ adapter disk and click Next.
8 Select "Choose the updated driver (Recommended)" and continue to click Next at each dialog until the driver files are copied.
9 When Windows has finished copying drivers, click Close and restart your system.

NOTE: For troubleshooting information, see the section *Windows Troubleshooting* earlier in this guide.

Windows NT Automatic Configuration

PCI computers automatically detect and configure PCI-compliant adapters while booting. The adapter IRQ level and I/O address are automatically set by the BIOS each time you start your computer.

Start your computer to automatically configure the adapter. Configuration is complete when Windows NT starts or when the DOS prompt appears.

If your computer displays an error while booting, it may require additional steps to configure. See the section *PCI Installation Tips* later in this guide for more information.

Windows NT Version 4.0 Only

After putting the adapter in the computer, connecting the cables and starting Windows NT, you need to install the correct drivers.

1. Double-click the Network icon in the Control Panel.
2. Click the Adapters tab.
3. Click Add. You'll see a list of adapters.
4. Don't select an adapter from this list. Instead, insert the PRO/100+ adapter disk or CD into the appropriate drive and click Have Disk.
5. Type D:\ (for CD) or A:\ (for floppy) in the dialog box and click OK. Then follow the prompts to complete installation. When the adapter is added you'll see a new adapter listed in the Network adapters list.
6. Click Close to finish.
7. Restart Windows NT when prompted.

Windows NT Version 3.51 Only

After putting the adapter in the computer, connecting the cables and starting Windows NT, you need to install the correct drivers.

1. Double-click the Network icon in the Control Panel.
2. Click Add Adapter.
3. When the list of adapters appears, scroll to the end of the list and select <Other> Requires disk from manufacturer and then click Continue.
4. Insert the PRO/100+ adapter disk or CD in the appropriate drive, specify that drive, and click OK.
5. Select the Intel(R) PRO Adapter and click OK. Drivers and utilities are installed.
6. The TCP/IP Configuration dialog box appears. Enter the appropriate information and click OK. Remove the installation disk or CD.
7. When prompted, restart Windows NT.

NOTE: For troubleshooting information, see the section *Windows NT Troubleshooting*, following.

Windows NT Troubleshooting

If Windows NT reports an error or you can't connect to the network, try the suggestions here first, then turn to the section *Troubleshooting and FAQs* later in this guide if necessary.

- Make sure that you use the drivers for this adapter. Drivers are located on the PRO/100+ adapter disk or CD.
- Make sure the driver is loaded and the protocols are bound. Check the Settings in the Control Panel's Network/Bindings dialog box.
- Check the Windows NT Event Viewer for error messages.
- If you are attaching to a NetWare network, check your frame type and verify that NetWare client or server software has been installed.
- Test the adapter with the PROSet advanced configuration utility that was installed on your system when you installed the PRO/100+ adapter. To start PROSet, double-click on the PROSet icon in the Windows control panel. To run diagnostics, select the adapter and click the Diagnostics tab, then click Run Tests. For additional information, click Help in the PROSet window.
- Check with your LAN administrator — you may need to install supplemental networking software.

DOS and Windows 3.1 Setup for Novell NetWare DOS ODI Clients

NOTE: Windows 95/98 users should refer to the previous sections on Windows 95/98. NetWare Client 32 users should refer to the NetWare readme files in the \NETWARE directory.

DOS and Windows 3.1 Automatic Configuration

PCI computers automatically detect and configure PCI-compliant adapters while booting. The BIOS sets the adapter IRQ level and I/O memory address automatically each time you start your computer.

Start your computer to automatically configure the adapter. Resource configuration is complete when the DOS prompt appears. You can now continue with the procedure below.

If your computer displays an error while booting, it may require additional steps to configure a PCI adapter. See *PCI Installation Tips* later in this guide for more information.

Run Setup to Install Network Drivers

Setup can automatically install NetWare DOS ODI client drivers for you or display a readme file with installation instructions for other NOS drivers.

1 If your computer already has network drivers installed, restart the computer without loading them. If the drivers are loaded from the AUTOEXEC.BAT or CONFIG.SYS file, type REM in front of each line that loads a network driver. Or, with DOS 6.x or later press F5 as DOS starts, to bypass the drivers.

2 Insert the PRO/100+ adapter disk in a drive, switch to that drive, and at the DOS prompt, type `SETUP` and press Enter.

3 Select the adapter from the menu.

4 Select Automatic Setup from the Main menu. Then follow the instructions on the screen. If you want to test the adapter with a responder on the network, see the *Responder Testing on the Network (Optional)* section later in this guide.

Setup displays the adapter's configuration and then runs a series of diagnostic tests that make sure the adapter and network are functioning properly. If Setup finds a problem, it displays the results and some possible solutions.

5 When Setup finishes the tests, you'll see the Install Network Drivers screen.

6 Select the driver you want to install. Setup can install a NetWare client driver for you. If you want to install other drivers, Setup displays a readme file with installation instructions.

To set duplexing options, see the *Duplex Mode (Optional)* section later in this guide.

Troubleshooting

If you can't connect to a server, first try the suggestions here, then turn to the *Troubleshooting and FAQs* section later in this guide.

- Make sure you're using the drivers for this adapter. The driver file name contains the letter B (for example, E100BODI.COM).
- If you're replacing an existing adapter, make sure the LINK statement in your NET.CFG is correct for the new adapter. For example, the LINK statement for a NetWare client is: `LINK DRIVER E100BODI`
- Verify that the frame type in your NET.CFG file matches your network.
- Test the adapter by running diagnostics in Setup. Additional testing is available by using a responder (see the next section).
- Check the readme files (see the inside front cover for instructions).

Responder Testing on the Network (Optional)

Setup can test the adapter more thoroughly if there is a responder on the network while you run the tests.

1 Go to a computer on the network with a comparable PCI adapter installed.

2 Run the appropriate configuration program for the installed adapter and set it up as a responder.

3 Return to the computer that has the new adapter. Run Setup and test the adapter by running diagnostics.

NetWare 3.11, 3.12, Client 32, UNIX*, Banyan VINES*, and Other Operating Systems

Refer to the online documents. On a DOS computer, view the appropriate readme file for information on installing your network driver.

To view the readme files, insert the PRO/100+ adapter disk into a drive, switch to that drive, and type:

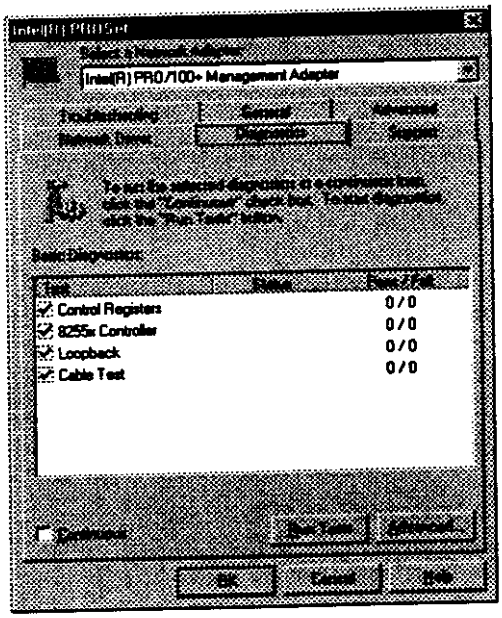
```
SETUP /README
```

and then press Enter.

PROSet: An Overview

When you install the PRO/100+ adapter Windows drivers, an advanced configuration utility called PROSet is also installed. Users running Windows NT or Windows 95/98 can easily test hardware and set standard and advanced adapter features with PROSet.

PROSet runs when you highlight an adapter and click the Properties button in the Network control panel. The main PROSet window is shown below.



Duplex Mode (Optional)

Duplexing is a performance option that lets you choose how the adapter sends and receives data packets over the network. The adapter can operate at full duplex only when connected to a full duplex 10BASE-T or 100BASE-TX switch, or to another full duplex adapter.

The possible settings for duplexing are:

- **Auto** (requires a full duplex adapter or switch with auto-negotiation capability). The adapter negotiates with the switch to send and receive packets at the highest rate. This is the default setting. If the switch does not provide auto-negotiation, the adapter runs at half duplex.
- **Full duplex** (requires a full duplex switch or adapter). The adapter can send and receive packets at the same time. This mode can increase adapter performance capability. If the full duplex switch provides auto-negotiation, the adapter runs at full duplex. If the full duplex switch does not provide auto-negotiation, you need to set the adapter duplex mode manually (see the following sections), because it defaults to half duplex.
- **Half duplex**. The adapter performs one operation at a time; it either sends or receives.

NOTE: If an adapter is running at 100 Mbps and half duplex, your potential bandwidth is higher than if you run it at 10 Mbps and full duplex.

Manually Configuring for Full Duplex

If your switch supports auto-negotiation with the N-way standard, duplex configuration is automatic and no action is required on your part. However, many currently-installed switches do not support auto-negotiation. Check with your network system administrator to verify whether your switch supports this feature. Most installations will require manual configuration to change to full duplex.

Configuration is specific to the driver you're loading for your network operating system (NOS).

To set up the duplex mode, refer to the section below that corresponds to your operating system.

CAUTION: Adapter performance may suffer or your adapter may not operate if your switch doesn't support full duplex and you configure the adapter to full duplex. The switch settings must always agree with the adapter. Also, make sure to always set the speed when you configure duplex.

Setting Full Duplex in DOS, ODI*, NDIS 2.01 Clients

For each adapter, edit the NET.CFG or PROTOCOL.INI file. If editing the NET.CFG file, add the following keywords to the Link Driver section. For the PROTOCOL.INI file, add these keywords anywhere:

```
FORCEDUPLEX 2

SPEED 100   (or 10 if 10BASE-T)
```

Setting Full Duplex in NetWare Servers

For each adapter in AUTOEXEC.NCF, edit the LOAD command and add the following options (you must include the equal sign for servers):

```
FORCEDUPLEX=2

SPEED=100  (or 10 if 10BASE-T)
```

For more information, see the readme file for NetWare computers.

Setting Full Duplex in Windows 95/98

While running Windows 95/98:

1. Double-click the PROSet icon from the Control Panel.
2. Click Settings.
3. In the Network Speed list box, click 10 or 100, according to the speed of your network.
4. In the Duplex Mode list box, click Full.
5. Click OK.
6. Restart Windows.

Setting Full Duplex in Other Operating Systems

See the OTHER.TXT readme file in the \OTHER directory on the PRO/100+ Client adapter disk. Open the file with any text editor.

Troubleshooting and FAQs

If the Adapter Can't Connect to the Network

Make sure the cable is installed properly.

The network cable must be securely attached at both RJ-45 connections (adapter and hub). The maximum allowable distance from adapter to hub is 100 meters. If the cable is attached and the distance is within acceptable limits but the problem persists, try a different cable.

If you're directly connecting two computers without a hub or switch, use a crossover cable.

Check the LED lights on the adapter.

The adapter has two diagnostic LEDs, one on each side of the cable connector. These lights help indicate if there's a problem with the connector, cable, or switch/hub.

LED Function Indicators

LED	Indication	Meaning
ACT/LNK	On	The adapter and switch are receiving power; the cable connection between the switch and adapter is good.
	Off	The adapter is not sending or receiving network data. The adapter and switch are not receiving power; the cable connection between the switch and adapter is faulty; or you have a driver configuration problem.
	Flashing	The adapter is sending or receiving network data. The frequency of the flashes varies with the amount of network traffic.
100	On	Operating at 100 Mbps.
	Off	Operating at 10 Mbps.

Make sure you're using the correct drivers.

Make sure you're using the drivers that come with this adapter. The driver file name always contains the letter B (for example, E100BODI.DOS). Drivers that support previous versions of this adapter don't support this version of the adapter.

Make sure the switch port and the adapter have the same duplex setting.

If you configured the adapter for full duplex, make sure the switch port is also configured for full duplex. Setting the wrong duplex mode can degrade performance, cause data loss, or result in lost connections.

Testing the Adapter (Diagnostics)

Test the adapter by running diagnostics. For DOS or Windows 3.1, run Setup on the PRO/100+ adapter disk. For Windows NT* and Windows 95/98, run PROSet by double-clicking on the PROSet icon in the Windows control panel. To run diagnostics, select the adapter and click the Diagnostics tab, then click Run Tests. For additional information, click Help in the PROSet window.

Frequently Asked Questions (FAQs)

SETUP.EXE reports the adapter is "Not enabled by BIOS."

The PCI BIOS isn't configuring the adapter correctly. See the *PCI Installation Tips* section later in this guide.

The computer hangs when the drivers are loaded.

- Change the PCI BIOS interrupt settings. See the *PCI Installation Tips section* for more information.
- If you are using EMM386, it must be version 4.49 or newer (this version ships with MS-DOS* 6.22 or newer).

Diagnostics pass, but the connection falls or errors occur.

- At 100 Mbps, use Category 5 wiring and make sure the network cable is securely attached.
- At 100 Mbps, connect to a 100BASE-TX hub/switch (not 100BASE-T4).
- For NetWare, make sure you specify the correct frame type in your NET.CFG file.
- Make sure the duplex mode setting on the adapter matches the setting on the switch.

The LNK LED doesn't light.

- Make sure you've loaded the network drivers.
- Check all connections at the adapter and the switch.
- Try another port on the switch.
- Make sure the duplex mode setting on the adapter matches the setting on the switch.
- Make sure you have the correct type of cable between the adapter and the hub. 100 BASE-TX requires two pairs. Some hubs require a crossover cable while others require a straight-through cable.

The ACT LED doesn't light.

- Make sure you've loaded the correct network drivers.
- The network may be idle. Try accessing a server.
- The adapter isn't transmitting or receiving data. Try another adapter.
- Make sure you're using two-pair cable for TX wiring.

The adapter stopped working without apparent cause.

- Run the diagnostics.
- Try reseating the adapter in its slot, or try a different slot if necessary.
- The network driver files may be corrupt or missing. Remove the drivers and then reinstall them.

The Wake on LAN feature is not working.

- Make sure the WOL cable is attached and that power is being applied to the computer.
- Check the BIOS for its WOL setting. Some computers may need to be configured for WOL.
- Make sure the network cable is fully attached to the adapter.

Link LED does not light when power is connected.

- Make sure the WOL cable is attached and power is applied to the computer.
- Make sure the network cable is attached at both ends.

Intel® Priority Packet: An Overview

Priority Packet is a traffic-prioritization utility that enables you to set up filters to process high priority traffic before normal traffic. Using Priority Packet, you can set up filters to give priority to critical applications or users.

Priority Packet is available at Intel's networking web site, http://www.intel.com/network.

Prioritizing Network Traffic

Intel's Priority Packet lets you set up filters to send information from critical nodes or applications with an indicated priority. By prioritizing traffic at the host or entry point of the network, network devices can base forwarding decisions on priority information defined in the packet.

Priority Packet prioritizes traffic based on filters—parameters you assign to be applied to outgoing (transmit) packets. Using the Priority Packet Filter Wizard, you can set up pre-defined or custom filters based on a node (MAC) address, Ethernet type, or by various properties of the protocol and port. Priority Packet provides two different methods for prioritizing traffic: IEEE 802.1p tagging and Intel High Priority Queue.

IEEE 802.1p Tagging

IEEE 802.1p is a new IEEE standard for tagging, or adding additional bytes of information to, packets with different priority levels. Packets are tagged with 4 additional bytes, which increase the packet size and indicate a priority level. When these packets are sent out on the network, the higher priority packets are transferred first. Priority packet tagging (also known as Traffic Class Expediting) allows the adapter to work with other elements of the network (switches, routers) to deliver priority packets first. 802.1p tagging enables you to assign specific priority levels from 0 (low) to 7 (high).

Using the 802.1p IEEE_802.1p standard for packet tagging, you can assign values to packets based on their priority. This method requires a network infrastructure that supports packet tagging. The routing devices receiving and transferring these packets on your network must support 802.1p for tagging to be effective.

After you set up the filter in Priority Packet, you must launch Intel PROSet and select '802.1p/802.1Q Tagging' on the Advanced Settings tab.

CAUTION: IEEE 802.1p tagging increases the size of the packets it tags. Some hubs and switches won't recognize the larger packets and will drop them. Check your hub or switch documentation to see if they support 802.1p. (You can configure the switch to strip the tags from the packets and send it on to the next destination as normal traffic.) If these devices don't support 802.1p or you're not sure, use High Priority Queue (HPQ) to prioritize network traffic.

The requirements for effectively using IEEE 802.1p tagging are:

- The other devices receiving and routing 802.1p tagged packets must support 802.1p.
- The adapters on these devices must support 802.1p (adapters using the Intel 82558 or later Ethernet controller). All PRO/100+ adapters support 802.1p. PRO/100B adapters do not.
- The adapter(s) cannot be assigned to an adapter team.
- If you're setting up VLANs and packet tagging on the same adapter, the '802.1p/802.1Q Tagging' must be 'Enabled' on the Intel PROSet Advanced Settings tab.

Intel High Priority Queue

If your network infrastructure devices don't support IEEE 802.1p or you're not sure, you can still define filters and send packets as high priority. While High Priority Queue (HPQ) doesn't provide the precise priority levels of 802.1p tagging, it does assign traffic as either high or low priority, and sends high priority packets first. Therefore, if there are multiple applications on a system sending packets, the packets from the application with a filter are sent out first. HPQ doesn't change network routing, nor does it add any information to the packets.

To assign HPQ, you can specify it using Priority Packet when you create or assign a filter.

To effectively use HPQ tagging, the adapter(s) cannot be assigned to an adapter team.

For more information on Priority Packet, see the related white paper at Intel's networking web site, http://www.intel.com/network.

PCI Installation Tips

PCI computers are designed to automatically configure add-in cards each time the computer starts. Your PCI computer sets the I/O address and IRQ level for your network adapter when the computer starts. These values cannot be changed by Intel adapter software. If you experience a problem when the computer starts, you may need to follow additional configuration steps.

On some computers, manual configuration is possible through the computer's PCI BIOS setup utility. Refer to your computer's documentation. You may need to verify or change some BIOS settings.

Some common PCI solutions are listed here:

- Busmaster-enabled slots. On some computers, not all slots are busmaster enabled by default. Check your BIOS PCI bus setting. It will be set to either Busmaster or Non-busmastered. Choose Busmaster.
- Reserve interrupts (IRQs) and/or memory addresses for ISA adapters. This prevents PCI cards from trying to use the same settings ISA cards are using. Check your PCI BIOS setup program. There may be IRQ options such as Enable for ISA, Reserve for ISA, or Disable for PCI. This option is sometimes in the Plug and Play area of the BIOS setup.
- Enable the PCI slot. In some PCI computers, you must use the PCI BIOS setup program to enable the PCI slot. This is especially common in PCI computers with the PhoenixBIOS*.
- Update your PCI BIOS. An updated PCI system BIOS can correct some PCI configuration problems. Call your computer manufacturer to see if an updated BIOS version is available for your computer.
- Configure the slot for level-triggered interrupts. The slot the adapter is using must be configured for level-triggered interrupts rather than edge-triggered interrupts. Check your PCI BIOS Setup program.

Here are some examples of PCI BIOS setup program parameters:

`PCI slot #:`	*Slot where the adapter is installed*
`Master:`	`ENABLED`
`Slave:`	`ENABLED`
`Latency timer:`	`40`
`Interrupt:`	*Choose an IRQ from the list*
`Edge-level:`	`Level`

The exact wording of these parameters varies with different computers.

Removing an Existing Adapter in Windows 95

If you are replacing an existing adapter with a PRO/100+ adapter, follow these steps *before* physically removing the adapter card:

1. Double-click My Computer.
2. Double-click Control Panel.
3. Double-click System.
4. Click the Device Manager tab.
5. Double-click Network Adapters.
6. Select the adapter driver listed below the Network Adapters group and click Remove.
7. Click OK.

8 Follow the instructions in the section *Put the Adapter in the Computer* at the start of this manual.

Push Installation for Windows 95

If you are a LAN administrator setting up server-based push installation of Windows 95 as defined in Microsoft Windows 95 Resource Kit, you'll need to follow additional steps for this adapter. Refer to the *Push Installation for Windows 95* readme file on the Intel support web site.

Fast Ethernet Wiring

100BASE-TX Specification: The 100BASE-TX specification supports 100 Mbps transmission over two pairs of Category 5 twisted-pair Ethernet (TPE) wiring. One pair is for transmit operations and the other for receive operations. Segment lengths are limited to 100 meters with 100BASE-TX for signal timing reasons. This complies with the EIA 568 wiring standard.

LANDesk Service Agent Notes

The following notes apply to PRO/100+ Management adapters that are equipped with the Intel LANDesk Service Agent (LSA) boot ROM option.

Canceling an LSA network boot

To cancel a network boot in progress, press Esc or Ctrl-C. This resets the adapter and lets the computer start up without the LSA boot ROM.

Setting the correct interrupt

During start-up, LSA works with the computer's BIOS. Current versions of LSA use interrupt 18h, while prior versions used 19h for compatibility with older BIOS chips. If your computer fails to start with LSA, you may need to manually switch the interrupt.

During start-up with LSA, this message appears, indicating which interrupt it is using:

PXE-M04: Hooking bootstrap interrupt 18h... or

PXE-M04: Hooking bootstrap interrupt 19h...

To toggle between interrupts during start-up, press Ctrl-T. If you change the value, it will be stored in the EEPROM on the adapter and will not need to be changed again.

Adapter Specifications

Compatibility	PCI v2.2 systems
Media (cable) Connectors and Wiring	RJ45 Use Category 5 cabling at 100 Mbps Supports 100BASE TX Fast Ethernet
Data Rate Mode	10 or 100 Mbps
Interrupt Levels	PCI: INTA
Power Requirements	1.06 Watts @ 5.0VDC
Isolation Voltage	200V RMS
Operating Temperature	0 - 55 degrees C
Humidity	10% - 90% non-condensing
Diagnostic LEDs	Activity/Link, 100 Mbps
Diagnostic Software	On-board PROSet, Setup Responder
Compliance & Certification	• Safety — UL • FCC Class B • CE & Immunity • C-tick (Australian)

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From North America:

Before returning any adapter product, contact Intel Customer Support and obtain a Return Material Authorization (RMA) number by calling +1 916-377-7000.

If the Customer Support Group verifies that the adapter product is defective, they will have the RMA department issue you an RMA number to place on the outer package of the adapter product. Intel cannot accept any product without an RMA number on the package.

All Other Locations:

Return the adapter product to the place of purchase for a refund or replacement.

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Software: Software provided with the adapter product is not covered under the hardware warranty described above. See the applicable software license agreement which shipped with the adapter product for details on any software warranty.

FCC Compliance Statement

This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

NOTE: This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CAUTION: If the device is changed or modified without permission from Intel, the user may void his or her authority to operate the equipment.

Canadian Compliance (Industry Canada)

When tested in at least one intended host:

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the interference-causing equipment standard entitled "Digital Apparatus", ICES-003 of the Canadian Department of Communications.

Cet appareil numérique respecte les limites bruits radioélectriques applicables aux appareils numériques de Class B prescrites dans la norme sur le matériel brouilleur: "Appareils Numériques", NMB-003 édictée par le Ministre Canadien des Communications.

Manufacturer Declaration

This certifies that the Intel PRO/100+ Client Adapter complies with the EU Directive 89/336/EEC, using the EMC standards EN55022 (Class B) and EN50082-1. This product also meets or exceeds EN 60950 requirements. This product has been tested and verified to meet CISPR 22 Class B requirements.

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Readme Files on Your Product Disk

Use the file editor of your choice to view the readme files located under the \INFO directory of the PRO/100+ adapter disk. Or, you can view these files from the DOS prompt. To do so, insert the PRO/100+ adapter disk in a disk drive, switch to that drive, and type:

`SETUP /README` and then press Enter.

Web and Internet Sites

Support: http://support.intel.com

Network Products: http://www.intel.com/network

Corporate: http://www.intel.com

FTP Host: download.intel.com

FTP Directory: /support/etherexpress

Customer Support Technicians

US and Canada: 1-916-377-7000 (7:00 - 17:00 M-F Pacific Time)

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